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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,789	11/24/2003	Kazunori Hagimoto	SUG-176-USAP	1591
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EXAMINER				
WEISS, HOWARD				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/718,789

**Applicant(s)**

HAGIMOTO ET AL.

**Examiner**

Howard Weiss

**Art Unit**

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 April 2007.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 33-38 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 33-38 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date 0507  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

Attorney's Docket Number: SUG-176-USAP

Filing Date: 11/24/03

Continuing Data: RCE established 11/15/2006

Claimed Foreign Priority Date: 11/28/2002, 12/25/2002, 1/31/2003, 8/29/2003

Applicant(s): Hagimoto et al. (Noto)

Examiner: Howard Weiss

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 33 to 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasutimi et al. (JP 2001-339100), Carter-Coman et al. (U.S. Patent No. 6,222,207), Burt (U.S. Patent No. 4,574,470) and Murasato et al. (U.S. Patent No. 5,744,829).

Yasutimi et al. show most aspects of the instant invention (e.g. Figure 2) including:

- A compound semiconductor layer **4** including a light-emitting layer consisting of N-type AlGaInP cladding layer **41**, an AlGaInP active layer **42** and a P-type AlGaInP cladding layer **43** and a light extraction surface **44** and sensitive to the wavelength ranges listed
- A silicon device substrate **2** bonded to said compound semiconductor layer
- A multilayered metal reflective layer **3** including an Au-based main metal layer **31** and another metal based **32** (i.e. Al) layer interposed between the Au-based layer and the compound semiconductor layer

Yasutimi et al. do not show the metal reflective layer being Ag based, an Ag-based contact layer as claimed, a Au/Sb or Au/Sn substrate side metal contact layer and a

silicon-diffusion-blocking layer of the composition claimed and the layers in the light-emitting layer to be explicitly composed of  $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$  where  $0 \leq x \leq 1$  and  $0 \leq y \leq 1$ .

Carter-Coman et al. teach (e.g. Figures 2) that a metal reflective layer **34** can be either Al- or Ag-based (Column 5 Lines 25 to 30) therefore establishing their equivalence, a contact layer **32** and a silicon-diffusion-blocking layer **36** made of a conductive material with Ti or Ni as a major component (e.g. NiV) and a substrate side AuSn layer **38** to produce an light emitting device with high reflectivity after subjected to high temperatures (Column 2 Lines 23 to 34). It would have been obvious to a person of ordinary skill in the art at the time of invention to make a metal reflective layer Ag-based, a contact layer, a silicon-diffusion-blocking layer and a substrate side AuSn layer as taught by Carter-Coman et al. in the device of Yasutimi et al. to produce an light emitting device with high reflectivity after subjected to high temperatures.

Burt teaches (e.g. Column 6 Lines 41 to 47) that NiV inherently blocks silicon diffusion. The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of prior art reference, a question of fact, arises both in the context of anticipation and obviousness." *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir.1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed.Cir. 1983).

Murasato et al. teach (e.g. Figure 1 and Column 3 Lines 55 to 63 and Column) to use double hetero-structure  $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$  where  $0 \leq x \leq 1$  and  $0 \leq y \leq 1$  in cladding layers **5,7** and active layer **6** to provide a high brightness, low operating voltage and high reliability device (Column 2 Lines 65 to 67). It would have been obvious to a person of ordinary skill in the art at the time of invention to use double hetero-structure  $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$  where  $0 \leq x \leq 1$  and  $0 \leq y \leq 1$  in cladding layers and active layer

as taught by Murasato et al. in the device of Yasutimi et al. to provide a high brightness, low operating voltage and high reliability device.

### ***Response to Arguments***

3. Applicant's arguments filed 4/6/2007 have been fully considered but they are not persuasive. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, the reasons for combining the references are stated in the rejection above.

In reference to the rejection not addressing the problem confronted by the claimed invention (i.e. degradation of reflectivity), the mere fact that the references relied upon by the Examiner to evince an appreciation of the problem identified and solved by the instant invention is not, standing alone, conclusive evidence of the non-obviousness of the claimed subject matter. The references may suggest doing what an applicant has done even though those of ordinary skill in the art were ignorant of the existence of the problem. *In re Gershon*, 152 USPQ 602 (CCPA 1967).

In reference to the substrate-side contact metal, this feature is shown in Yasutomi et al. as layer **32** and was not explicitly pointed out in the previous Office Action. This has been corrected in the rejection above.

In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

### ***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).
6. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via [Howard.Weiss@uspto.gov](mailto:Howard.Weiss@uspto.gov). If attempts to reach the examiner by

telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

8. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/ 96, 98, E33.068	thru 9/27/2007
Other Documentation: none	
Electronic Database(s): EAST	thru 9/27/2007

HW/hw  
28 September 2007

/Howard Weiss/  
Primary Examiner  
Art Unit 2814